SOUTHWEST FISHERIES SCIENCE CENTER (SWFSC)
THIRD QUARTER REPORT-FY 2003
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Title of Accomplishment or Milestone: Measure growth in total factor productivity in the western and central Pacific tuna purse seine fishery.

Current Status of Accomplishment or Milestone: Total factor productivity growth was estimated for the following tuna purse seine fleets of the Western and Central Pacific Ocean: Japan, Korea, Taiwan, USA, Federated States of Micronesia, and PNG. The results were presented to the 15th Annual South Pacific Tuna Treaty Consultation in Majuro, Marshall Islands on March 12, 2004. The analysis was conducted using data envelopment analysis to estimate Malmquist total factor productivity indices by flag for three different set types: (1) log, (2) school, and (3) fishing aggregator devices or FADs.

Background Information: Growth in total factor productivity or fishing power is one of the most important contributors to increases in fishing capacity in the Western and Central Pacific Ocean. Growth in total factor productivity is particularly strong for FAD fishing. The increase in fishing capacity and increase in supply of skipjack from recent increases in FAD fishing have contributed to a precipitous decline in the exvessel price of cannery grade skipjack tuna. The price has fallen below the break-even operating cost level of US purse seine vessels and threatens the viability of the US fleet. The management of fishing capacity in the Western and Central Pacific Ocean has become a key concern to the US Department of State and the National Marine Fisheries Service and to Korea and Japan. The issue has also become a central point of debate at the most Preparatory Conference in Fiji for the nascent Western and Central Pacific Convention to manage highly migratory species. In addition, several nations at the 24th Session of the FAO s Committee on Fisheries requested FAOs assistance in addressing the problem of tuna overcapacity on a global scale. The development of a comprehensive methodology and empirical results measuring the growth in total factor productivity or fishing power can contribute to this FAO project and thus to better understanding and measuring the growth in fishing capacity on a global scale.

Purpose of Activity: The objective of the analysis was to develop an improved methodology for estimating total factor productivity in tuna purse seine fishing industries and to measure the increased productivity or fishing power that is playing a large role in increasing fishing capacity. The analysis developed a new methodology to incorporate environmental variables into productivity measures and to provide a Malmquist index of overall changes in resource abundance and the state of the environment. The analysis also explored two alternative ways to account for the effects on productivity growth from changes in capacity utilization and utilization of the capital stock. The analysis also developed the methodological and theoretical basis for incorporating the form of joint production represented by log, school, and FAD fishing.

Description of Accomplishment (e.g., to the Center, to Management, and to NMFS Strategic Plan Goals) and significant results: The measures of total factor productivity or fishing power demonstrate that increased FAD fishing are a major contributor to increased fishing capacity in the Western and Central Pacific Ocean. The productivity measures also demonstrate that log and school fishing are not major contributors to increases in fishing capacity. The results are important to the efforts of the US Department of State and NMFS to support the US tuna purse seine industry in the WCPO and also

contribute to the three-year FAO Project GCP/INT/851/JPN, Management of Tuna Fishing Capacity: Conservation and Socio-Economics, which began in 2003.

Significance of Accomplishment: Measures of productivity growth are a major contributor to increases in fishing capacity. These measures help to better measure, document, and understand growth in fishing capacity and how to best manage it.

Problems: None

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